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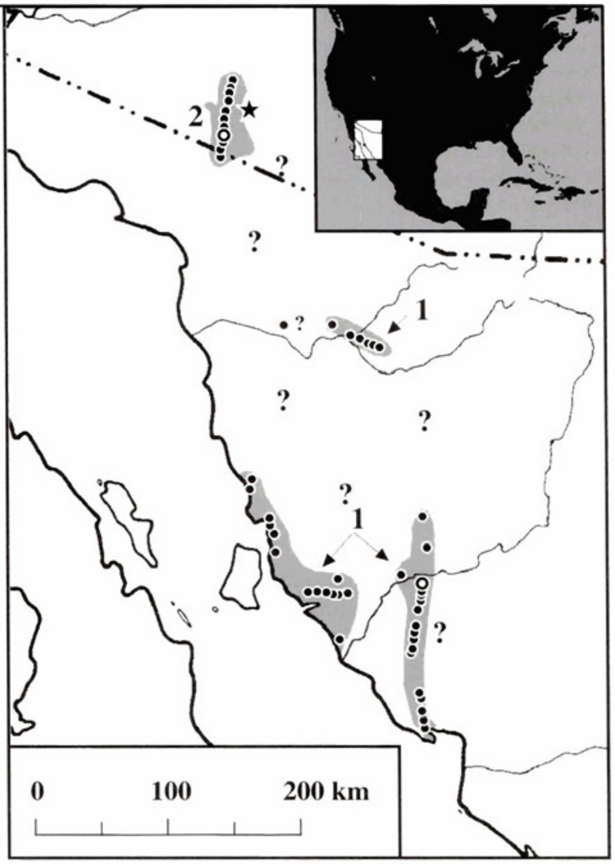
Chionactis palarostris (Klauber)
Sonoran Shovel-Nosed Snake

Sonora palarostris Klauber 1937:363. Type-locality, "5 miles south of Magdalena, Sonora, Mexico," ("six miles south of Hermosillo, Sonora, Mexico," by redesignation; Blake 1970; see **Remarks**). Holotype, formerly in the private collection of Laurence M. Klauber (LMK) 26771, now San Diego Society of Natural History (SDSNH) 26771, adult male collected by George S. Lindsay in April 1937 (examined by CRM).
Sonora occipitalis palarostris: Stickel 1941:137.
Chionactis occipitalis palarostris: Stickel 1943:123.
Chilomeniscus palarostris: Case 1983:170. Misapplication of generic name.

• **CONTENT.** Two subspecies are recognized: *palarostris* and *organica*.

• **DEFINITION.** *Chionactis palarostris* is a small colubrid species with a maximum recorded TL of 391 mm (Klauber 1951). The tail is relatively short, averaging 19.7% and 16.5% of SVL in males and females, respectively. The small head is slightly convex in profile, beginning at the center of the frontal and ending at the snout. The snout is blunt, somewhat truncated in appearance. A slight constriction between the head and body is present. Scutellation is as follows: dorsal scale rows usually 15–15–15; ventrals 139–161 (139–150, males; 152–161, females); subcaudals 39–50 (39–50, males; 39–43, females); supralabials 7 (rarely 6 or 8); infralabials 7–8 (rarely 6); nasals, loreals, and preoculars single; postoculars paired; temporals 1 + 2 (rarely 1 + 3). Dorsal scales are smooth, with a single apical pit, and the anal (cloacal) plate and subcaudals are divided. The third and fourth supralabials contact the orbit and the sixth is the largest. The pupil is round.

The dorsal color pattern consists of alternating black and red crossbands or saddles separated by narrow bands (1–1.75



MAP. Distribution of *Chionactis palarostris*. Circles indicate type localities, that of *C. palarostris* was redesignated by Blake (1970) (see **Remarks**). Dots indicate other known localities; some dots represent two or more proximate localities or several individuals. The star indicates a fossil record site. The small question mark represents a record of uncertain validity. The large question marks indicate gaps in the geographic range where voucher specimens are lacking in spite of presumably suitable habitat. All localities plotted are based on museum records; the authors did not examine all museum specimens to validate identification.



FIGURE. *Chionactis palarostris organica* from Organ Pipe Cactus National Monument, Pima County, Arizona (photograph by C. Schwalbe).

scales wide) of cream to pale yellow ground color. Triads of yellow-black-yellow are separated by red crossbands or saddles. Black crossbands usually number less than 21 (range 10–20, rarely 21 or 22) on the body and 3–5 crossbands on the tail. Black bands are longest middorsally, covering 3–5 scales end to end, narrowing laterally, and crossing the venter (usually on 2 ventral scales) to form complete body rings. These bands are narrower than the interspaces and more or less half as wide as the interspaces middorsally (see subspecies descriptions). Interspaces vary from 4–12 scales long. Red bands are 2–6.5 scales long middorsally and may be more or less as long laterally. The red bands terminate 1–3 scale rows above the ventrals. Dark brown to black maculations are present on the red bands laterally. Four to 16 scales occur between the parietals and the anterior edge of the first black crossband (see subspecies descriptions). The black parietal blotch is somewhat rectangular in form, covering the posterior 2/3 of the frontal and supraoculars, and extending back to the posterior edge of the parietal, engaging the upper edges of the posterior supralabials, orbit, preocular, and, occasionally, the loreal. The venter is pale yellow to cream on the head and body (Klauber 1951).

• **DIAGNOSIS.** *Chionactis palarostris* is distinquished from *C. occipitalis* by possessing a more convex and truncated snout, a somewhat rectangular black parietal blotch, fewer crossbands on the body and tail, and broad red saddles in the interspaces (Mahrdt et al. 2001).

• **DESCRIPTIONS.** Klauber (1937) published the original description of *Chionactis* (*Sonora*) *palarostris*, based on a single specimen (SDSNH 26771) from Sonora, México. Additional comments on the species' status were provided by Stickel (1941), based on a second specimen (MCZ 36890) collected 50 miles west of Hermosillo, Sonora. Detailed descriptions of scalation, color pattern, and size were published in Klauber (1951) and Blake (1970). An analysis of geographic variation among localized populations, based on 39 characters of scalation, color pattern, and mensuration appeared in Cross (1979). General descriptions of color pattern and other distinquishing features were published in Hensley (1950), Stebbins (1954, 1966, 1985), Wright and Wright (1957), Fowlie (1965), Cagle (1968), Cochran and Goin (1970), Klauber (1972), Leviton (1972), Brown (1974), Behler and King (1979), Smith and Brodie (1982), Mattison (1989), and Stoops and Wright (1993). Funk (1967) provided a general description differentiating *C. palarostris* from *C. saxatilis* (but see **Comment**).

• **ILLUSTRATIONS. Line drawings** of *C. palarostris* were published by Stebbins (1954), Cagle (1968), Endemic Species Committees (1982), and on the cover of Rosen et al. (1996). Line drawings comparing the head shape of *C. palarostris* to that of *C. occipitalis* are in Powell et al. (1998). **Color illustrations** are in Stebbins (1966, 1985), Brown (1974), Simon (1979), and Smith and Brodie (1982). A color illustration in Zim and Smith (1953) appears to be of *C. palarostris*. **Black and white photographs** are in Klauber (1951), Hecht and Marien (1956), Wright and Wright (1957), Parker (1963), Fowlie (1965), Blake (1970), Cochran and Goin (1970), and Frank (1979). **Color photographs** of live specimens appeared in Switak (1978, 1986, 1993), Behler and King (1979), Obst et al. (1988), Mattison (1989), Campbell and Lamar (1989), Coborn (1991), and Bartlett and Tennant (2000). A color photograph in Markel (1989) is of *C. palarostris*, not *C. occipitalis*. Lowe et al. (1986) published a color photograph comparing the anterior dorsal body pattern of *C. palarostris* with that of *Micruroides euryxanthus*. A **color photograph of the habitat** appeared in Switak (1993).

• **DISTRIBUTION.** *Chionactis palarostris* occurs in the Sonoran Desert, ranging from barely north of Organ Pipe Cactus National Monument in extreme south-central Pima County, Arizona, south to Guyamas in northwestern Sonora. Collection records show that most specimens have been found on dirt or paved roadways. Hensley (1950) reported the first record of *C. palarostris* in the United States, and Rosen et al. (1996) reported the northernmost record as 37.46 km north of the U.S.-Mexico border. Extensive road cruising by M. Hensley and W. Supernaugh (1944–1951) and, more recently, by P. Rosen and P. Holm (1988–1993) has added greatly to our understanding of the species' distribution and habitat. This species is a habitat specialist, occurring on gravelly middle bajadas and flat areas in sandy to rocky soil habitats with relatively open vegetation. It ranges from sea level to approximately 760 m in elevation.

As currently understood, the distribution of *C. palarostris* is highly disjunct. Three centers of distribution are recognized in Sonora: 1) vicinity of Altar to the west of Santa Ana, 2) Hermosillo to Guaymas, and 3) the coastal Gulf of California region from Kino Bay north to El Desemboque del Río San Ignacio. Distributional gaps in the range of *C. palarostris* can be attributed, at least in part, to the lack of available roads and inaccessibility to field biologists of regions where middle bajadas occur, especially in northern Sonora. Features of this habitat are not present along Mexico Hwy. 15 between Santa Ana and Hermosillo, although *C. palarostris* may well be widespread and abundant on middle bajadas westward from the highway, if not to the east. No voucher specimens or literature records document localities to the north and east of El Desemboque del Río San Ignacio, or in the region northwest of Altar. Additional field work is necessary to more precisely document the distribution of *C. p. palarostris* in Sonora, México, and *C. p. organica* on the bajadas east and south of the Ajo Mountains in southern Pima County, Arizona.

Range maps appeared in Stebbins (1954, 1966, 1985), Wright and Wright (1957), Savage (1959), Fowlie (1965), Shaw and Campbell (1974), Behler and King (1979), Smith and Brodie (1982), Rosen et al. (1996), and Bartlett and Tennant (2000).

• **FOSSIL RECORD.** Van Devender et al. (1991) described two vertebrae from early Holocene woodrat middens in Organ Pipe Cactus National Monument and tentatively assigned this material to *C. palarostris*. Holman (2000) included *Chionactis* cf. *C. palarostris* from the Rancholabrean II to Early Holocene of Arizona.

• **PERTINENT LITERATURE.** Klauber (1937, 1951) provided orginal descriptions and the first comprehensive review of *C. palarostris*, and included comments on its ecology, behavior, and habits. The species' ecology, habitat requirements, diet, seasonal and diel activity, reproduction, and distribution were discussed by Lowe and Rosen (1992), Rosen and Lowe (1996), and Rosen et al. (1996). General accounts on **natural history** are in Stebbins (1954, 1966, 1985), Wright and Wright (1957), Fowlie (1965), Leviton (1972), Shaw and Campbell (1974), Behler and King (1979), Burton (1991), David et al. (1994), and Bartlett and Tennant (2000). *Chionactis palarostris* was included in **annotated and regional checklists** by Bogert and Oliver (1945), Smith and Taylor (1945, 1966), Schmidt (1953), Conant et al. (1956), Dowling (1975a), Collins et al. (1978, 1982), Frost (1979), Endemic Species Committees (1982), Collins (1990, 1997), Flores-Villela (1993), Beltz (1995), Frank and Ramus (1995), and Rosen and Lowe (1996). Case (1983) included *C. palarostris* in a list of reptiles endemic to Sonora, Mexico. Brattstrom (1994) included *C. palarostris* in a list of desert snakes with unique habitat requirements and small geographic ranges. **Type specimens** were listed in Sloan (1965),

McCoy and Censky (1982), and Pregill and Berrian (1984). The **type locality** was listed in Smith and Taylor (1950) and **reference citations for México** were provided by Smith and Smith (1973, 1976). *Chionactis palarostris* was included in **taxonomic keys** by Stickel (1943), Klauber (1951), Stebbins (1954), Wright and Wright (1957), Savage (1959), Fowlie (1965), Cagle (1968), Casas Andreu and McCoy (1979), Ballinger and Lynch (1988), and Powell et al. (1998).

Various aspects of the species' biology include the following: **antipredator strategies** (Jackson et al. 1976), **habitat** (Zweifel and Norris 1955, Lowe 1964, Rosen and Lowe 1996), **mimicry** (Hecht and Marien 1956; Parker 1963; Grobman 1978; Orr 1979; Russell 1980, 1983; Gehlbach 1981; Pough 1988; Campbell and Lamar 1989), and **reproduction** (Hensley 1950, Goldberg and Rosen 1999). The impact of **highway mortality** on *C. palarostris* and other desert snake populations was discussed in Rosen and Lowe (1994) and Mattison (1995). Malkin (1962) discussed the **ethnozoology** of the Seri culture and questioned the Seri's ability to distinguish *C. palarostris* from *Micruroides euryxanthus*.

• **REMARKS.** In a checklist of the herpetofauna of Mexico, Flores-Villela and Fernandez (1988) erroneously included *C. palarostris* as occurring in Baja California and failed to list its presence in Sonora. Flores-Villela and Gomez (1989) also erroneously included *C. palarostris* as occurring in Baja California. This species is not known from Baja California (L. Grismer, pers. comm.).

Blake (1970) proposed the subspecies *C. p. seri*, ranging from 65 km north of El Desemboque del Río San Ignacio south to Kino Bay and inland to approximately 30 km north of Hermosillo, Sonora, México. His description, using five characters, was based on the holotype (LACM 40598) and 13 paratypes, all of which have close affinities to *C. p. organica*. Cross (1979) noted that "further consideration of the status of the coastal population prompted Blake to exclude the formal trinomial designation from a later manuscript in favor of emphasizing the clinal nature of the character variation within *C. p. organica* (R. Blake, pers. comm.)." Blake's description was never formally published and recognized and, therefore, *C. p. seri* remains an invalid name.

Klauber (1937) gave the type locality of *C. p. palarostris* as "five miles south of Magdalena, Sonora, Mexico." Later, Smith and Taylor (1950) emended the type locality as "5 miles south of Santa Magdalena." The holotype was collected by George Lindsay. However, G. Lindsay (pers. comm.) stated that "... through no fault of Dr. Klauber, the precise locality given in the orginal description may be in error. I suspect that the specimen was taken a few miles south of Hermosillo, rather than near Magdalena, and that the wrong locality information was given to Dr. Klauber. I think the snake locality data was confused with some plant collections made a few miles south of Magdalena, Sonora" (Blake 1970). Blake's redesignation of the type locality as "six miles south of Hermosillo, Sonora, Mexico" is clearly justified. Despite several collecting efforts, *C. p. palarostris* has not been documented in the vicinity of Magdalena, Santa Ana, and Benjamin Hill. Nearly all *C. p. palarostris* specimens have been collected between Hermosillo and Guaymas, approximately 175–300 km south of Magdalena.

No published records document predation on *C. palarostris*. A *Micruroides euryxanthus* collected in the Organ Pipe Cactus National Monument was reported to have regurgitated a *C. p. organica* (CM 42311) in April 1966. Rosen (unpubl. dissection notes) observed a female *C. p. organica* (210 mm SVL) in the stomach of a DOR *Lampropeltis getula* (589 mm SVL) collected in Organ Pipe Cactus National Monument in August 1988.

• **ETYMOLOGY.** The name *palarostris* is derived from the Latin *pala* meaning "shovel or spade" and the Latin *rostrum* meaning "snout or beak," in reference to the shovel-shaped morphology of the snout. The subspecies name *organica* is a toponym in reference to the Organ Pipe Cactus National Monument, where the holotype and 14 paratypes were collected.

1. *Chionactis palarostris palarostris* (Klauber)
Sonoran Shovel-Nosed Snake

Sonora palarostris Klauber 1937:363. See species synonymy.
Chionactis palarostris palarostris: Klauber 1951:175. First use of present combination.

• **DEFINITION.** This subspecies has 8–20 black bands on the body. The black bands are less than half as long middorsally as the interspaces. Dorsal scales number 8–20 between the parietals and the anterior edge of the first black body band.

2. *Chionactis palarostris organica* Klauber
Organ Pipe Shovel-Nosed Snake

Chionactis palarostris organica Klauber 1951:178. Type locality, "on the Sonoyta–Ajo road, 9 miles north of the U.S.-Mexican Border, in the Organ Pipe Cactus National Monument, Pima County, Arizona." Holotype, formerly in the private collection of Laurence M. Klauber (LMK) 40673, now San Diego Society of Natural History (SDSNH) 40673, an adult male collected by W.R. Supernaugh and G.E. Steele on 22 May 1950 (examined by CRM).

• **DEFINITION.** This subspecies has 13–20 black bands on the body. The black bands are more than half as long middorsally as the interspaces. Dorsal scales number 4–6 between the parietals and the anterior edge of the first black body band.

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